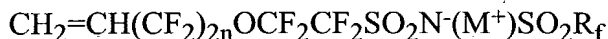


CLAIMS

What is claimed is:

1. A monomer of the formula

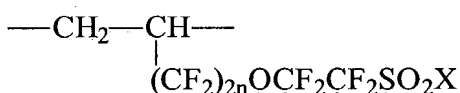


- 5 where  $n \geq 1$  and  $\text{M}^+ = \text{H}^+$  or an alkali metal cation, and  $\text{R}_f$  is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygens.

2. The monomer of Claim 1 wherein  $\text{M}^+$  is  $\text{H}^+$  or  $\text{Li}^+$ .

3. The monomer of Claim 1 wherein  $\text{R}_f$  is  $\text{CF}_3$  and  $n=1$ .

4. A polymer comprising monomer units of  $\text{VF}_2$  and 1 to 40 mol % of  
10 ionic monomer units described by the formula



- 15 where  $n \geq 1$ , X is  $\text{O-M}^+$ , or  $\text{N}^-(\text{M}^+)\text{SO}_2\text{R}_f$  where  $\text{M}^+$  is  $\text{H}^+$  or an alkali metal cation and  $\text{R}_f$  is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygens.

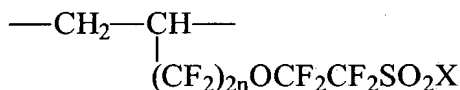
5. The polymer of Claim 4 wherein the concentration of said ionic monomer units is 6 to 16 mol- %.

6. The polymer of Claim 4 wherein X is  $\text{N}^-(\text{M}^+)\text{SO}_2\text{R}_f$  where  $\text{M}^+$  is  $\text{H}^+$   
20 or an alkali metal cation and  $\text{R}_f$  is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygens.

7. The polymer of Claim 4 or 6 wherein  $\text{M}^+$  is  $\text{H}^+$  or  $\text{Li}^+$ .

8. The polymer of Claim 6 wherein  $\text{R}_f$  is  $\text{CF}_3$ , and  $n=1$ .

9. A polymer comprising monomer units of ethylene, tetrafluoro-  
25 ethylene, and 4 to 20 mol % of functionalized monomer units represented by the formula



- 30 where X is F,  $\text{O-M}^+$ , or  $\text{N}^-(\text{M}^+)\text{SO}_2\text{R}_f$  where  $\text{M}^+$  is  $\text{H}^+$  or an alkali metal cation and  $\text{R}_f$  is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygens.

10. The polymer of Claim 9 wherein X is  $N^-(M^+)SO_2R_f$  where  $M^+$  is  $H^+$  or an alkali metal cation and  $R_f$  is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygens.

11. The polymer of Claim 9 or 10 wherein  $M^+$  is  $H^+$  or  $Li^+$ .

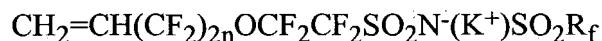
5 12. The polymer of Claim 9 or 10 wherein  $R_f$  is  $CF_3$  and  $n=1$ .

13. A process for forming a composition of the formula  
 $CH_2=CH(CF_2)_{2n}OCF_2CF_2SO_3^-M^+$  where  $M^+$  is  $H^+$  or an alkali metal cation, the process consisting essentially of contacting a composition represented by the formula  $CH_2=CH(CF_2)_{2n}OCF_2CF_2SO_2F$  with a weakly basic solution of an alkali metal salt or hydroxide in a polar solvent, the solution having a pH of less than ca. 12, at a temperature in the range of 0-50°C.

14. The process of Claim 13 wherein the alkali metal salt or hydroxide is an alkali metal carbonate.

15 15. The process of Claim 14 wherein the alkali metal carbonate is lithium carbonate.

16. A process for forming a composition of the formula



where  $R_f$  is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygens, the process consisting essentially of

20 forming a 0.001-5 molar solution of  $R_fSO_2NH_2$  in an organic solvent; combining said solution with  $CH_2=CH(CF_2)_{2n}OCF_2CF_2SO_2F$  and KF to form a mixture;

heating said mixture to 50-180°C;

separating the product.

25 17. The process of Claim 16 wherein  $R_f$  is  $CF_3$  and  $n=1$ .